

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-169916

(43)Date of publication of application : 30.06.1997

(51)Int.Cl.

C08L101/00

A01N 25/10

A01N 25/30

A01N 25/34

A01N 31/14

A01N 53/02

A01N 53/08

C08K 5/04

C09K 3/16

C09K 3/16

C09K 3/16

C09K 3/16

C09K 3/16

(21)Application number : 07-330917

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(22)Date of filing : 19.12.1995

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### (54) INSECTPROOF RESIN COMPOSITION AND MOLDED FORM THEREOF

#### (57)Abstract:

**PROBLEM TO BE SOLVED:** To obtain an insectproof resin composition having sustainable pestcontrolling effect over a long period without impairing the physical properties inherent in the resin, thus useful as e.g. a housing material for electronic equipment etc., by incorporating a specific resin with each specific amount of a pyrethroid-based pest-controlling agent and a plasticizer.

**SOLUTION:** This insectproof resin composition is obtained by incorporating (A) 100 pts.wt. of a resin (e.g. ABS resin, rigid vinyl chloride-based resin, polycarbonate, polystyrene, acrylic resin or olefin resin) containing an antistatic component (e.g. permanent antistatic agent containing hydrophilic polymer, anionic, cationic, nonionic or amphoteric antistatic agent, antistatic plasticizer) with (B) 0.05-10 pts.wt. of a pyrethroid-based pest-controlling agent such as terallethrin, pyrethrin or permethrin and (C) 0.05-10 pts.wt. of a plasticizer as 21 migration promoter for the pestcontrolling agent on the surface of the composition (e.g. a phthalic ester-based one), and, according as necessary, (D) 0.05-10 pts.wt. of a pest-controlling effect enhancer such as octachlorodipropyl ether or piperonyl butoxide.

#### LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

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**CLAIMS**

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[Claim(s)]

[Claim 1] The insect control resin constituent characterized by containing the pyrethroid system insecticide 0.05 - 10 weight sections per [ containing an antistatic nature component ] resin 100 weight section, and containing a plasticizer 0.05 - 10 weight sections as a shift accelerator of the insecticide to a front face further.

[Claim 2] The insect control resin constituent characterized by containing the pyrethroid system insecticide 0.05 - 10 weight sections per [ containing an antistatic nature component ] resin 100 weight section, and containing a plasticizer 0.05 - 10 weight sections, and the effectiveness enhancement agent 0.05 - 10 weight sections as a shift accelerator of the insecticide to a front face further.

[Claim 3] The insect control resin constituent according to claim 1 or 2 with which the resin containing an antistatic nature component is characterized by being ABS plastics, rigid PVC, a polycarbonate, polystyrol, acrylic resin, or olefine resin.

[Claim 4] A insect control resin constituent given in claim 1 thru/or any of 3 they are. [ which is characterized by an antistatic nature component being the antistatic agent thru/or surfactant, or antistatic nature plasticizer of the permanent antistatic agent which also includes a hydrophilic giant molecule, an anion system, a cation system, a non-ion system, or both sexes ]

[Claim 5] The resin Plastic solid characterized by consisting of a insect control resin constituent given in any [ claim 1 thru/or ] of 4 they are.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] In this invention, it is related with an insect-pest-control resin constituent and its Plastic solid. Therefore, it is related more with the resin constituent which prevents penetration of the cockroach to housing materials, such as electronic equipment, a lighting device, and an alarm device, an automatic vending machine, a kitchen machine, a wallplate, head-lining material, etc., an ant, the centipede, a chironomid, the spider, etc. in a detail, and prevents penetration of the noxious insect inside a Plastic solid by giving insect control nature to resin itself, and has long-term insect control durability, and its Plastic solid.

[0002]

[Description of the Prior Art] Generating of mold is promoted by change of a current and housing format, and generating of a noxious insect is increasing. Although use of the aerosol which used the insecticide, a fumigant, poison bait, a capture machine, etc. is generally conventionally carried out to the cure of such damage, the durability of effectiveness is long and as inadequate as about one year.

[0003] As an art which gives the durability of insect control nature, an insecticide is made to microencapsulate and they are ABS plastics (acrylonitrile / styrene / butadiene resins) in aiming at improvement in durability \*\*\*\*, Although the method of making hard [ PVC ] etc. contain an insecticide was generally taken, without an insecticide carrying out bleeding to a front face, since resin is hard, sufficient effectiveness was not discovered to a medically important insect, coming-flying noxious insect, unpleasant noxious insect, and clothing noxious insect, it had the fault which does not have the manifestation of effectiveness at all after prolonged progress, and it was cost quantity further.

[0004]

[Problem(s) to be Solved by the Invention] As a result of inquiring so that the manifestation of sufficient effect may not be accepted to insect control nature but it may solve these faults wholeheartedly in a Prior art, then, this invention By blending a pyrethroid system insecticide into the resin containing an antistatic nature component, and making a plasticizer and/or an effectiveness enhancement agent contain as a shift accelerator of the insecticide to a front face further The durability of a insect control operation to a noxious insect could be controlled, and, moreover, it found out that the durability of the insect control effectiveness was obtained over a long period of time.

[0005] That is, the purpose of this invention offers the resin which has a insect control operation to a noxious insect, has the durability of a insect control operation over a long period of time, and is to offer the insect control resin constituent which moreover does not spoil the physical properties of resin original, and its Plastic solid.

[0006]

[Means for Solving the Problem] According to this invention, the pyrethroid system insecticide 0.05 - 10 weight sections are contained per [ containing an antistatic nature component ] resin 100 weight section, and the Plastic solid which fabricates this constituent in the insect control resin constituent list which has the durability of the insect control operation characterized by containing a plasticizer 0.05 - 10 weight sections, and/or the effectiveness enhancement agent 0.05 - 10 weight sections as a shift accelerator of the insecticide to a front face, and grows into it is offered further.

[0007]

[Embodiment of the Invention] It is the description to make the pyrethroid system insecticide 0.05 - 10 weight sections contain to the resin 100 weight section containing an antistatic nature component in this invention, and to make the shift accelerator of the insecticide to a front face contain a plasticizer 0.05 - 10 weight sections, and/or the effectiveness enhancement agent 0.05 - 10 weight sections further.

[0008] By using the above-mentioned insect control resin constituent, compared with the case where an insecticide is independently blended with resin, such as ABS plastics, a polycarbonate, hard [ PVC ], polystyrol, acrylic resin, and olefin system resin, a insect control operation can be made to maintain over a long period of time to a noxious insect, and, moreover, the physical properties of resin original are not spoiled.

[0009] Even if it generally blends a pyrethroid system insecticide with the resin represented by ABS plastics, a polycarbonate, hard [ PVC ], polystyrol, acrylic resin, olefin system resin, etc., it is included after the pyrethroid system insecticide has kept good relations inside resin for high compatibility, and surface migration is checked, and the insect control effectiveness is hardly discovered.

[0010] Then, although what is made for an insecticide to shift to a front face by making these resin contain an

antistatic nature component (the radical of antistatic nature is also a hydrophilic radical at coincidence) was tried, to the surface migration of an insecticide, it was not yet enough.

[0011] The shift to the resin Plastic solid front face of a pyrethroid system insecticide was effectively performed to this a plasticizer or by blending an effectiveness enhancement agent further, and this invention persons found out that the insect control effectiveness moreover continued while blending the pyrethroid system insecticide with the resin containing an antistatic nature component.

[0012] Please refer to the example mentioned later. That is, also when a pyrethroid system insecticide is blended with the ABS plastics which gave permanent antistatic nature (example 1 of a comparison) and the passage of time is carried out not to mention the first stage, the shift to the front face of an insecticide is hardly produced.

Moreover, also when a pyrethroid system insecticide and a plasticizer are blended with the ABS plastics which have not given antistatic nature in combination (example 2 of a comparison) and the passage of time is carried out not to mention the first stage, the shift to the front face of an insecticide is not almost produced effectively. On the other hand, when a pyrethroid system insecticide and a plasticizer are blended with the ABS plastics which gave permanent antistatic nature in combination (example 1), while the shift to the front face of an insecticide is performed effectively, the shift after weathering processing is also performed effectively and it excels also in the durability of the insect control engine performance notably. Furthermore, if an effect enhancement agent is used together (example 4), translatability will be reinforced more and durability's will improve.

[0013] In this invention, the combination of the resin and the plasticizer containing an antistatic nature component Promoting the shift to the resin Plastic solid front face of a pyrethroid system insecticide is found out as a phenomenon, and it is a thing. The reason Although never restrained by this, sufficient path for making an insecticide shift to a resin front face is secured, and it is thought that it is useful to making the shape of a mesh carry out differential powder of the transient phase of an insecticide to resin.

[0014] If it is also important for the resin 100 weight section containing an antistatic nature component to use a pyrethroid system insecticide, a plasticizer, and/or an effectiveness enhancement agent by the above-mentioned quantitative ratio and the amount of an insecticide is less than the above-mentioned range in this invention, it will become inadequate in respect of the insect control effectiveness, and if it exceeds the above-mentioned range on the other hand, it will become dissatisfied in respect of resin physical properties. Moreover, if the amount of a plasticizer is less than the above-mentioned range, shifting to a front face will become inadequate, and if it exceeds the above-mentioned range, it will become dissatisfied in respect of resin physical properties. The same is said of the amount of an effectiveness enhancement agent.

[0015] In [resin] this invention, resin, such as ABS plastics, rigid polyvinyl chloride, a polycarbonate, polystyrol (HIPS, GPPS), acrylic resin, polyethylene, polypropylene, ethylene / vinyl acetate copolymer, and a polyamide, can be used as resin.

[0016] An antistatic nature component is a polyether (for example, polyethylene leno KISHIDO) with a hydrophilic giant molecule. A polyether amide, a polyether ester amide, polyether ester imide, An ethylene oxide epihalohydrin copolymer, an ethylene oxide epichlorohydrin polymer, etc., the quarternary ammonium salt (a quarternary-ammonium-salt radical content (meta) acrylate copolymer —) which is a cation activator Sulfonates, such as a quarternary-ammonium-salt radical content maleimide copolymer (polystyrene sulfonate SODA etc.), A primary-amine salt, a tertiary-amine salt, the phosphate that is an anion activator, The polyhydric-alcohol fatty acid ester which is nonionic active agents, such as an alkyl-sulfonic-acid salt, The carboxylic-acid derivative which are both-sexes activators, such as fatty alcohol ethylene oxide, an imidazoline derivative and an antistatic nature plasticizer (the SANSO sizer C-100 and the product made from C-300 New Japan Chemical industry —) Or AM-801 The compound which has at least one sort of antistatic nature machines chosen from the group which consists of the Sekisui Chemical make etc. is used in independent or two or more sorts of combination.

[0017] Or the resin containing the ingredient which has an antistatic nature machine can also be used. For example, it is used in that the compound which has at least one sort of antistatic nature machines chosen from the group which consists of the ingredient and permanent antistatic ABS plastics (TOYORAKKUPARERU; the Toray Industries make, ADEON; Asahi Chemical make) which contained a permanent antistatic agent (LEO REXX AS Dai-Ichi Kogyo Seiyaku make) and PERESUTATTO (Mitsuhiro formation make) to resin, an antistatic nature plasticizer, etc. is independent, or two or more sorts of combination.

[0018] As a pyrethroid system insecticide, TERARE thorin, pyrethrin, permethrin, SAIFE glycerin, allethrin, free-wheel-plate RUSURIN, PURARE thorin, FURAME thorin, RESUME thorin, PIRESUME thorin, FENO thorin, bifenthrin, SHIFENO thorin, SHIFURU thorin, delta METORIN, TORAROME thorin, en pen thorin, It is used in that at least one sort of pyrethroid system compounds chosen from the group which consists of fenvalerate, SAIPAME thorin, etofenprox, full FEMPUROKKUSU, full BUROKISHIFEN, and silafluofen are independent, or two or more sorts of combination.

[0019] As a plasticizer, ester system plasticizers, such as a phthalate ester plasticizer and an adipic ester plasticizer, a polyester plasticizer, a phosphate plasticizer, a chlorine-based plasticizer, etc. are raised.

[0020] What is generally known as a pyrethrin synergist as an effectiveness enhancement agent, Namely, the matter which can reinforce an insecticidal activity by mixing a certain matter which does not have an insecticidal activity in a pyrethroid system insecticide is used. For example, at least one sort of compounds chosen from the OKUTA chloro dipropyl ether (S-421), piperonyl butoxide, cinepyrine 500, n-propyl IZOMU, SAFUROKISHIN, and the group that consists of MGK-264 are used in independent or two or more sorts of combination.

[0021] Resin which contains an antistatic nature component in this invention (it is good the pyrethroid system

insecticide 0.05 - 10 weight sections, and to use for the 100 weight sections which may also contain the resin which has an antistatic nature machine in the amount of 0.1 - 5 weight section especially, and it still better for the shift accelerator of the insecticide to a front face a plasticizer 0.05 - 10 weight sections especially 0.2 - 5 weight section and/or the powerful agent 0.05 - 10 weight sections, and to contain 0.2 - 5 weight section especially.)

[0022] As long as a pyrethroid system insecticide exists in the method of combination of a pyrethroid system insecticide at the time of kneading of resin, there is especially no limit and it may be beforehand blended with resin, a plasticizer, and/or an effectiveness enhancement agent. Of course, these can be masterbatch-ized and it can also knead with a non-compound.

[0023] In the resin constituent of this invention, other additives, for example, inorganic fillers, a neutralizer, an antioxidant, an ultraviolet ray absorbent, a crystalline-nucleus agent, a pigment, a dispersant, a peroxide, etc. can be added if needed.

[0024] Moreover, shaping of extrusion molding, inflation SHON shaping, injection molding, blow molding, press forming, etc. is possible for the resin constituent of this invention, and it is useful as the component parts, such as a housing material of electronic equipment, an automatic vending machine, a kitchen machine, a wallplate, and head-lining material.

[0025]

[Example] Hereafter, although an example explains this invention concretely, this invention is not limited to these examples. In addition, % and the section which are shown in the insecticide shown in Table 1, the plasticizer, and the effect enhancement agent are weight criteria.

[0026] As opposed to the example 1 - 7 permanent antistatic ABS-plastics 100 weight section (TOYORAKKUPARERU TP10 Toray Industries make), As a pyrethroid system insecticide, etofenprox (Mitsui Toatsu Chemicals make), Allethrin (Sumitomo Chemical make) and permethrin (Sumitomo Chemical make) further As a plasticizer, JI and 2 ethylhexyl phthalate (DOP, Sekisui Chemical make), Predetermined carries out amount combination of the OKUTA chloro dipropyl ether (S-421, Sankyo make) as JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make), and an effect enhancement agent. After mixing to homogeneity with a Henschel mixer, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0027] To the example 8 permanent antistatic ABS-plastics 100 weight section (ADEON A100 Asahi Chemical make), as a pyrethroid system insecticide, etofenprox (Mitsui Toatsu Chemicals make) and after blending the predetermined amount and mixing JI and 2 ethylhexyl horse mackerel peat (DOA Sekisui Chemical make) to homogeneity with a Henschel mixer as a plasticizer further, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0028] To the example 9 permanent antistatic ABS-plastics 100 weight section (TOYORAKKUPARERU TP10 Toray Industries make), as a pyrethroid system insecticide, etofenprox (Mitsui Toatsu Chemicals make) and after predetermined having carried out amount combination of JI and the 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make) as a plasticizer and mixing to homogeneity with a Henschel mixer further, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0029] As [ after distributing the permanent antistatic-agent LEO REXX AS(Dai-ichi Kogyo Seiyaku make) 10 weight section to homogeneity at the example 10 ABS-plastics (product made from No.15 JSR) 90 weight section ] a pyrethroid system insecticide Etofenprox (Mitsui Toatsu Chemicals make) and after blending the predetermined amount and mixing JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make) to homogeneity with a Henschel mixer as a plasticizer further, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0030] It is etofenprox (Mitsui Toatsu Chemicals make) as a pyrethroid system insecticide to the example 11 - 12. hard PVC compound 100 weight section, Furthermore, after having blended the OKUTA chloro dipropyl ether (S-421) as a plasticizer, blending the predetermined amount as JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make), and an effect enhancement agent and mixing to homogeneity with a Henschel mixer, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0031] After blending the predetermined amount and mixing etofenprox (Mitsui Toatsu Chemicals make) to homogeneity with a Henschel mixer as a pyrethroid system insecticide at the example of comparison 1 permanent antistatic ABS-plastics 100 weight section (TOYORAKKUPARERU TP10 Toray Industries make), extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0032] In the example of comparison 2 ABS-plastics (product made from No.15 JSR) 100 weight section, as a pyrethroid system insecticide, etofenprox (Mitsui Toatsu Chemicals make) and after blending the predetermined amount and mixing JI and 2 ethylhexyl phthalate (DOP) to homogeneity with a Henschel mixer as a plasticizer further, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0033] In the example of comparison 3 ABS-plastics (product made from No.15 JSR) 100 weight section, as a pyrethroid system insecticide, etofenprox (Mitsui Toatsu Chemicals make) and after blending the predetermined amount and mixing JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make) to homogeneity with a Henschel mixer as a plasticizer further, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0034] It is etofenprox (Mitsui Toatsu Chemicals make) as a pyrethroid system insecticide to the example of comparison 4 ABS-plastics (product made from No.15 JSR) 100 weight section, Furthermore, after having blended

the OKUTA chloro dipropyl ether (S-421 Sankyo make) as a plasticizer, blending the predetermined amount with JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make) as an effect enhancement agent and mixing to homogeneity with a Henschel mixer, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0035] It is allethrin (Sumitomo Chemical make) as a pyrethroid system insecticide to the example of comparison 5 ABS-plastics (product made from No.15 JSR) 100 weight section. Furthermore, after having blended the OKUTA chloro dipropyl ether (S-421 Sankyo make) as a plasticizer, blending the predetermined amount with JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make) as an effect enhancement agent and mixing to homogeneity with a Henschel mixer, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0036] \* The insect control effectiveness was evaluated about the sheet obtained in the effect nature examples 1-12 and the examples 1-6 of a comparison over a cockroach. On the above-mentioned sheet, the approach put in five *Blattella germanica* sexes each in the diameter beaker of 9cm, and investigated aging of the rate of knockdown at the time of making it contact directly. The trial followed the specimen which carried out weathering processing for six months just behind manufacture and under 60 degrees C. The result is shown in Table 1.

ノックダウン頭数

$$\text{ノックダウン率 (\%)} = \frac{\text{ノックダウン頭数}}{\text{全ゴキブリ頭数}}$$

[0037]

[Table 1]

ノックダウン率

例	樹脂	防虫剤 (%)	可塑剤 (%)	効力 増強剤 (%)	耐候処理	ノックダウン率 (%)					
						5	12	24	48	72 (hr)	
実施例 1	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOP 3	—	無 60℃×6ヶ月	0	20	40	50	60	
実施例 2	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOP 2	S-421 1	無 60℃×6ヶ月	10	30	30	60	70	
実施例 3	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOA 1	—	無 60℃×6ヶ月	10	20	40	60	80	
実施例 4	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOA 1	S-421 1	無 60℃×6ヶ月	30	60	70	100	100	
実施例 5	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOA 2	—	無 60℃×6ヶ月	20	50	70	80	100	
実施例 6	ABS	7-ヒドロキシ-7-ヘキシルノナン	DOA 2	—	無 60℃×6ヶ月	30	30	40	60	60	
実施例 7	ABS	4-ヒドロキシ-4-ヘキシルノナン	DOA 2	—	無 60℃×6ヶ月	20	30	30	60	70	
実施例 8	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOA 2	—	無 60℃×6ヶ月	10	20	40	60	60	
実施例 9	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	C-300 2	—	無 60℃×6ヶ月	10	20	60	60	90	
実施例 10	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOA 1	—	無 60℃×6ヶ月	0	20	40	50	70	
実施例 11	硬質PVC	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOA 2	—	無 80℃×6ヶ月	0	10	10	40	50	
実施例 12	硬質PVC	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOA 3	S-421 1	無 60℃×6ヶ月	10	30	50	70	90	
比較例 1	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	—	—	無 60℃×6ヶ月	0	0	0	10	10	
比較例 2	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOP 2	—	無 60℃×6ヶ月	0	0	0	20	30	
比較例 3	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOA 2	—	無 60℃×6ヶ月	0	0	10	20	20	
比較例 4	ABS	1,1-ジクロロ-2,2-ビス(4-クロロフェニル)エタン	DOA 2	S-421 1	無 60℃×6ヶ月	0	10	30	30	30	
比較例 5	ABS	7-ヒドロキシ-7-ヘキシルノナン	DOA 2	S-421 1	無 60℃×6ヶ月	0	10	20	30	30	

[0038]

[Effect of the Invention] While making the resin 100 weight section containing an antistatic nature component contain the pyrethroid system insecticide 0.05 - 10 weight sections according to this invention, the insect control operation over a noxious insect can be made to be able to discover effectively by shift, and the insect control effectiveness can be made to maintain over a long period of time by containing a plasticizer 0.05 - 10 weight sections, and/or the effectiveness enhancement agent 0.05 - 10 weight sections in the shift accelerator of the insecticide to a front face.

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**TECHNICAL FIELD**

[Field of the Invention] In this invention, it is related with an insect-pest-control resin constituent and its Plastic solid. Therefore, it is related more with the resin constituent which prevents penetration of the cockroach to housing materials, such as electronic equipment, a lighting device, and an alarm device, an automatic vending machine, a kitchen machine, a wallplate, head-lining material, etc., an ant, the centipede, a chironomid, the spider, etc. in a detail, and prevents penetration of the noxious insect inside a Plastic solid by giving insect control nature to resin itself, and has long-term insect control durability, and its Plastic solid.

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**EFFECT OF THE INVENTION**

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[Effect of the Invention] While making the resin 100 weight section containing an antistatic nature component contain the pyrethroid system insecticide 0.05 – 10 weight sections according to this invention, the insect control operation over a noxious insect can be made to be able to discover effectively by shift, and the insect control effectiveness can be made to maintain over a long period of time by containing a plasticizer 0.05 – 10 weight sections, and/or the effectiveness enhancement agent 0.05 – 10 weight sections in the shift accelerator of the insecticide to a front face.

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**TECHNICAL PROBLEM**

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[Description of the Prior Art] Generating of mold is promoted by change of a current and housing format, and generating of a noxious insect is increasing. Although use of the aerosol which used the insecticide, a fumigant, poison bait, a capture machine, etc. is generally conventionally carried out to the cure of such damage, the durability of effectiveness is long and as inadequate as about one year.

[0003] As an art which gives the durability of insect control nature, an insecticide is made to microencapsulate and they are ABS plastics (acrylonitrile / styrene / butadiene resins) in aiming at improvement in durability \*\*\*\*, Although the method of making hard [ PVC ] etc. contain an insecticide was generally taken, without an insecticide carrying out bleeding to a front face, since resin is hard, sufficient effectiveness was not discovered to a medically important insect, coming-flying noxious insect, unpleasant noxious insect, and clothing noxious insect, it had the fault which does not have the manifestation of effectiveness at all after prolonged progress, and it was cost quantity further.

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**MEANS**

[Means for Solving the Problem] According to this invention, the pyrethroid system insecticide 0.05 – 10 weight sections are contained per [ containing an antistatic nature component ] resin 100 weight section, and the Plastic solid which fabricates this constituent in the insect control resin constituent list which has the durability of the insect control operation characterized by containing a plasticizer 0.05 – 10 weight sections, and/or the effectiveness enhancement agent 0.05 – 10 weight sections as a shift accelerator of the insecticide to a front face, and grows into it is offered further.

[0007]

[Embodiment of the Invention] It is the description to make the pyrethroid system insecticide 0.05 – 10 weight sections contain to the resin 100 weight section containing an antistatic nature component in this invention, and to make the shift accelerator of the insecticide to a front face contain a plasticizer 0.05 – 10 weight sections, and/or the effectiveness enhancement agent 0.05 – 10 weight sections further.

[0008] By using the above-mentioned insect control resin constituent, compared with the case where an insecticide is independently blended with resin, such as ABS plastics, a polycarbonate, hard [ PVC ], polystyrol, acrylic resin, and olefin system resin, a insect control operation can be made to maintain over a long period of time to a noxious insect, and, moreover, the physical properties of resin original are not spoiled.

[0009] Even if it generally blends a pyrethroid system insecticide with the resin represented by ABS plastics, a polycarbonate, hard [ PVC ], polystyrol, acrylic resin, olefin system resin, etc., it is included after the pyrethroid system insecticide has kept good relations inside resin for high compatibility, and surface migration is checked, and the insect control effectiveness is hardly discovered.

[0010] Then, although what is made for an insecticide to shift to a front face by making these resin contain an antistatic nature component (the radical of antistatic nature is also a hydrophilic radical at coincidence) was tried, to the surface migration of an insecticide, it was not yet enough.

[0011] The shift to the resin Plastic solid front face of a pyrethroid system insecticide was effectively performed to this a plasticizer or by blending an effectiveness enhancement agent further, and this invention persons found out that the insect control effectiveness moreover continued while blending the pyrethroid system insecticide with the resin containing an antistatic nature component.

[0012] Please refer to the example mentioned later. That is, also when a pyrethroid system insecticide is blended with the ABS plastics which gave permanent antistatic nature (example 1 of a comparison) and the passage of time is carried out not to mention the first stage, the shift to the front face of an insecticide is hardly produced. Moreover, also when a pyrethroid system insecticide and a plasticizer are blended with the ABS plastics which have not given antistatic nature in combination (example 2 of a comparison) and the passage of time is carried out not to mention the first stage, the shift to the front face of an insecticide is not almost produced effectively. On the other hand, when a pyrethroid system insecticide and a plasticizer are blended with the ABS plastics which gave permanent antistatic nature in combination (example 1), while the shift to the front face of an insecticide is performed effectively, the shift after weathering processing is also performed effectively and it excels also in the durability of the insect control engine performance notably. Furthermore, if an effect enhancement agent is used together (example 4), translatability will be reinforced more and durability's will improve.

[0013] In this invention, the combination of the resin and the plasticizer containing an antistatic nature component Promoting the shift to the resin Plastic solid front face of a pyrethroid system insecticide is found out as a phenomenon, and it is a thing. The reason Although never restrained by this, sufficient path for making an insecticide shift to a resin front face is secured, and it is thought that it is useful to making the shape of a mesh carry out differential powder of the transient phase of an insecticide to resin.

[0014] If it is also important for the resin 100 weight section containing an antistatic nature component to use a pyrethroid system insecticide, a plasticizer, and/or an effectiveness enhancement agent by the above-mentioned quantitative ratio and the amount of an insecticide is less than the above-mentioned range in this invention, it will become inadequate in respect of the insect control effectiveness, and if it exceeds the above-mentioned range on the other hand, it will become dissatisfied in respect of resin physical properties. Moreover, if the amount of a plasticizer is less than the above-mentioned range, shifting to a front face will become inadequate, and if it exceeds the above-mentioned range, it will become dissatisfied in respect of resin physical properties. The same is said of the amount of an effectiveness enhancement agent.

[0015] In [resin] this invention, resin, such as ABS plastics, rigid polyvinyl chloride, a polycarbonate, polystyrol (HIPS, GPPS), acrylic resin, polyethylene, polypropylene, ethylene / vinyl acetate copolymer, and a polyamide, can

be used as resin.

[0016] An antistatic nature component is a polyether (for example, polyethylene leno KISHIDO) with a hydrophilic giant molecule. A polyether amide, a polyether ester amide, polyether ester imide, An ethylene oxide epichlorohydrin copolymer, an ethylene oxide epichlorohydrin polymer, etc., the quaternary ammonium salt (a quaternary-ammonium-salt radical content (meta) acrylate copolymer —) which is a cation activator Sulfonates, such as a quaternary-ammonium-salt radical content maleimide copolymer (polystyrene sulfonate SODA etc.), A primary-amine salt, a tertiary-amine salt, the phosphate that is an anion activator, The polyhydric-alcohol fatty acid ester which is nonionic active agents, such as an alkyl-sulfonic-acid salt, The carboxylic-acid derivative which are both-sexes activators, such as fatty alcohol ethylene oxide, an imidazoline derivative and an antistatic nature plasticizer (the SANSO sizer C-100 and the product made from C-300 New Japan Chemical industry —) Or AM-801 The compound which has at least one sort of antistatic nature machines chosen from the group which consists of the Sekisui Chemical make etc. is used in independent or two or more sorts of combination.

[0017] Or the resin containing the ingredient which has an antistatic nature machine can also be used. For example, it is used in that the compound which has at least one sort of antistatic nature machines chosen from the group which consists of the ingredient and permanent antistatic ABS plastics (TOYORAKKUPARERU; the Toray Industries make, ADEON; Asahi Chemical make) which contained a permanent antistatic agent (LEO REXX AS Dai-Ichi Kogyo Seiyaku make) and PERESUTATTO (Mitsuhiro formation make) to resin, an antistatic nature plasticizer, etc. is independent, or two or more sorts of combination.

[0018] As a pyrethroid system insecticide, TERARE thorin, pyrethrin, permethrin, SAIFE glycerin, allethrin, free-wheel-plate RUSURIN, PURARE thorin, FURAME thorin, RESUME thorin, PIRESUME thorin, FENO thorin, bifenthrin, SHIFENO thorin, SHIFURU thorin, delta METORIN, TORAROME thorin, en pen thorin, It is used in that at least one sort of pyrethroid system compounds chosen from the group which consists of fenvalerate, SAIPAME thorin, etofenprox, full FEMPUROKKUSU, full BUROKISHIFEN, and silafluofen are independent, or two or more sorts of combination.

[0019] As a plasticizer, ester system plasticizers, such as a phthalate ester plasticizer and an adipic ester plasticizer, a polyester plasticizer, a phosphate plasticizer, a chlorine-based plasticizer, etc. are raised.

[0020] What is generally known as a pyrethrin synergist as an effectiveness enhancement agent, Namely, the matter which can reinforce an insecticidal activity by mixing a certain matter which does not have an insecticidal activity in a pyrethroid system insecticide is used. For example, at least one sort of compounds chosen from the OKUTA chloro dipropyl ether (S-421), piperonyl butoxide, cinepyrine 500, n-propyl IZOMU, SAFUROKISHIN, and the group that consists of MGK-264 are used in independent or two or more sorts of combination.

[0021] Resin which contains an antistatic nature component in this invention (it is good the pyrethroid system insecticide 0.05 - 10 weight sections, and to use for the 100 weight sections which may also contain the resin which has an antistatic nature machine in the amount of 0.1 - 5 weight section especially, and it still better for the shift accelerator of the insecticide to a front face a plasticizer 0.05 - 10 weight sections especially 0.2 - 5 weight section and/or the powerful agent 0.05 - 10 weight sections, and to contain 0.2 - 5 weight section especially.)

[0022] As long as a pyrethroid system insecticide exists in the method of combination of a pyrethroid system insecticide at the time of kneading of resin, there is especially no limit and it may be beforehand blended with resin, a plasticizer, and/or an effectiveness enhancement agent. Of course, these can be masterbatch-ized and it can also knead with a non-compound.

[0023] In the resin constituent of this invention, other additives, for example, inorganic fillers, a neutralizer, an antioxidant, an ultraviolet ray absorbent, a crystalline-nucleus agent, a pigment, a dispersant, a peroxide, etc. can be added if needed.

[0024] Moreover, shaping of extrusion molding, inflation SHON shaping, injection molding, blow molding, press forming, etc. is possible for the resin constituent of this invention, and it is useful as the component parts, such as a housing material of electronic equipment, an automatic vending machine, a kitchen machine, a wallplate, and head-lining material.

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3. In the drawings, any words are not translated.

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EXAMPLE

[Example] Hereafter, although an example explains this invention concretely, this invention is not limited to these examples. In addition, % and the section which are shown in the insecticide shown in Table 1, the plasticizer, and the effect enhancement agent are weight criteria.

[0026] As opposed to the example 1 - 7 permanent antistatic ABS-plastics 100 weight section (TOYORAKKUPARERU TP10 Toray Industries make), As a pyrethroid system insecticide, etofenprox (Mitsui Toatsu Chemicals make), Allethrin (Sumitomo Chemical make) and permethrin (Sumitomo Chemical make) further As a plasticizer, JI and 2 ethylhexyl phthalate (DOP, Sekisui Chemical make), Predetermined carries out amount combination of the OKUTA chloro dipropyl ether (S-421, Sankyo make) as JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make), and an effect enhancement agent. After mixing to homogeneity with a Henschel mixer, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0027] To the example 8 permanent antistatic ABS-plastics 100 weight section (ADEON A100 Asahi Chemical make), as a pyrethroid system insecticide, etofenprox (Mitsui Toatsu Chemicals make) and after blending the predetermined amount and mixing JI and 2 ethylhexyl horse mackerel peat (DOA Sekisui Chemical make) to homogeneity with a Henschel mixer as a plasticizer further, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0028] To the example 9 permanent antistatic ABS-plastics 100 weight section (TOYORAKKUPARERU TP10 Toray Industries make), as a pyrethroid system insecticide, etofenprox (Mitsui Toatsu Chemicals make) and after predetermined having carried out amount combination of JI and the 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make) as a plasticizer and mixing to homogeneity with a Henschel mixer further, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0029] As [ after distributing the permanent antistatic-agent LEO REXX AS(Dai-Ichi Kogyo Seiyaku make) 10 weight section to homogeneity at the example 10 ABS-plastics (product made from No.15 JSR) 90 weight section ] a pyrethroid system insecticide Etofenprox (Mitsui Toatsu Chemicals make) and after blending the predetermined amount and mixing JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make) to homogeneity with a Henschel mixer as a plasticizer further, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0030] It is etofenprox (Mitsui Toatsu Chemicals make) as a pyrethroid system insecticide to the example 11 - 12 hard PVC compound 100 weight section, Furthermore, after having blended the OKUTA chloro dipropyl ether (S-421) as a plasticizer, blending the predetermined amount as JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make), and an effect enhancement agent and mixing to homogeneity with a Henschel mixer, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0031] After blending the predetermined amount and mixing etofenprox (Mitsui Toatsu Chemicals make) to homogeneity with a Henschel mixer as a pyrethroid system insecticide at the example of comparison 1 permanent antistatic ABS-plastics 100 weight section (TOYORAKKUPARERU TP10 Toray Industries make), extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0032] In the example of comparison 2 ABS-plastics (product made from No.15 JSR) 100 weight section, as a pyrethroid system insecticide, etofenprox (Mitsui Toatsu Chemicals make) and after blending the predetermined amount and mixing JI and 2 ethylhexyl phthalate (DOP) to homogeneity with a Henschel mixer as a plasticizer further, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0033] In the example of comparison 3 ABS-plastics (product made from No.15 JSR) 100 weight section, as a pyrethroid system insecticide, etofenprox (Mitsui Toatsu Chemicals make) and after blending the predetermined amount and mixing JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make) to homogeneity with a Henschel mixer as a plasticizer further, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0034] It is etofenprox (Mitsui Toatsu Chemicals make) as a pyrethroid system insecticide to the example of comparison 4 ABS-plastics (product made from No.15 JSR) 100 weight section, Furthermore, after having blended the OKUTA chloro dipropyl ether (S-421 Sankyo make) as a plasticizer, blending the predetermined amount with JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make) as an effect enhancement agent and mixing to homogeneity with a Henschel mixer, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0035] It is allethrin (Sumitomo Chemical make) as a pyrethroid system insecticide to the example of comparison 5 ABS-plastics (product made from No.15 JSR) 100 weight section, Furthermore, after having blended the OKUTA chloro dipropyl ether (S-421 Sankyo make) as a plasticizer, blending the predetermined amount with JI and 2 ethylhexyl horse mackerel peat (DOA, Sekisui Chemical make) as an effect enhancement agent and mixing to homogeneity with a Henschel mixer, extrusion molding was carried out and the specimen of the shape of a 10x10mm sheet was obtained by the thickness of 1mm.

[0036] \* The insect control effectiveness was evaluated about the sheet obtained in the effect nature examples 1-12 and the examples 1-6 of a comparison over a cockroach. On the above-mentioned sheet, the approach put in five Blattella germanica sexes each in the diameter beaker of 9cm, and investigated aging of the rate of knockdown at the time of making it contact directly. The trial followed the specimen which carried out weathering processing for six months just behind manufacture and under 60 degrees C. The result is shown in Table 1.

ノックダウン頭数

$$\text{ノックダウン率 (\%)} = \frac{\text{ノックダウン頭数}}{\text{全ゴキブリ頭数}}$$

[0037]  
[Table 1]

ノックダウン率

例	樹脂	防虫剤 (%)	可塑剤 (%)	効力増強剤 (%)	耐候処理	ノックダウン率 (%)					
						5	12	24	48	72 (hr)	
実施例 1	ABS	1-ブチルピリピロキス 1	DOP 3	-	無 60°C × 6ヶ月	0	20	40	50	60	
実施例 2	ABS	1-ブチルピリピロキス 2	DOP 2	S-421 1	無 60°C × 6ヶ月	10	30	30	60	70	
実施例 3	ABS	1-ブチルピリピロキス 1	DOA 1	-	無 60°C × 6ヶ月	10	20	40	60	80	
実施例 4	ABS	1-ブチルピリピロキス 1	DOA 1	S-421 1	無 60°C × 6ヶ月	30	60	70	100	100	
実施例 5	ABS	1-ブチルピリピロキス 2	DOA 2	-	無 60°C × 6ヶ月	20	50	70	80	100	
実施例 6	ABS	7-オクチルピリピロキス 2	DOA 2	-	無 60°C × 6ヶ月	20	50	60	70	90	
実施例 7	ABS	8-オクチルピリピロキス 2	DOA 2	-	無 60°C × 6ヶ月	30	30	40	60	60	
実施例 8	ABS	1-ブチルピリピロキス 2	DOA 2	-	無 60°C × 6ヶ月	10	30	30	40	40	
実施例 9	ABS	1-ブチルピリピロキス 2	C-300 2	-	無 60°C × 6ヶ月	10	20	60	60	90	
実施例 10	ABS	1-ブチルピリピロキス 1	DOA 1	-	無 60°C × 6ヶ月	0	10	30	80	70	
実施例 11	硬質PVC	1-ブチルピリピロキス 2	DOA 2	-	無 60°C × 6ヶ月	0	10	10	40	50	
実施例 12	硬質PVC	1-ブチルピリピロキス 3	DOA 3	S-421 1	無 60°C × 6ヶ月	0	10	30	70	90	
比較例 1	ABS	1-ブチルピリピロキス 2	-	-	無 60°C × 6ヶ月	0	0	0	10	10	
比較例 2	ABS	1-ブチルピリピロキス 2	DOP 2	-	無 60°C × 6ヶ月	0	0	0	20	30	
比較例 3	ABS	1-ブチルピリピロキス 2	DOA 2	-	無 60°C × 6ヶ月	0	0	10	20	20	
比較例 4	ABS	1-ブチルピリピロキス 2	DOA 2	S-421 1	無 60°C × 6ヶ月	0	10	30	30	30	
比較例 5	ABS	7-オクチルピリピロキス 2	DOA 2	S-421 1	無 60°C × 6ヶ月	0	10	20	30	30	

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[Translation done.]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平9-169916

(43) 公開日 平成9年(1997)6月30日

(51) Int.Cl. <sup>8</sup>	識別記号	庁内整理番号	F I	技術表示箇所
C 0 8 L 101/00	L T B		C 0 8 L 101/00	L T B
A 0 1 N 25/10			A 0 1 N 25/10	
25/30			25/30	
25/34			25/34	Z
31/14			31/14	
審査請求 未請求 請求項の数 5 O L (全 6 頁) 最終頁に続く				

(21) 出願番号 特願平7-330917

(22) 出願日 平成7年(1995)12月19日

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(54) 【発明の名称】 防虫樹脂組成物およびその成形体

(57) 【要約】

【課題】 害虫に対して防虫作用を有する樹脂を提供するものであり、長期間にわたって防虫作用の持続性を有し、しかも樹脂本来の物性を損なわない防虫樹脂組成物およびその成形体を提供するにある。

【解決手段】 帯電防止性成分を含有する樹脂100重量部当たりピレスロイド系防虫剤0.05～10重量部を含有し、さらに、表面への防虫剤の移行促進剤として可塑剤0.05～10重量部を含有することを特徴とする防虫樹脂組成物。



## 【特許請求の範囲】

【請求項1】 帯電防止性成分を含有する樹脂100重量部当たりビスロイド系防虫剤0.05～10重量部を含有し、さらに、表面への防虫剤の移行促進剤として可塑剤0.05～10重量部を含有することを特徴とする防虫樹脂組成物。

【請求項2】 帯電防止性成分を含有する樹脂100重量部当たりビスロイド系防虫剤0.05～10重量部を含有し、さらに、表面への防虫剤の移行促進剤として可塑剤0.05～10重量部及び効果増強剤0.05～10重量部を含有することを特徴とする防虫樹脂組成物。

【請求項3】 帯電防止性成分を含有する樹脂が、ABS樹脂、硬質塩化ビニル樹脂、ポリカーボネート、ポリスチロール、アクリル樹脂、またはオレフィン樹脂であることを特徴とする請求項1または2記載の防虫樹脂組成物。

【請求項4】 帯電防止性成分が、親水性高分子をも包含する永久帯電防止剤、アニオン系、カチオン系、非イオン系或いは両性の帯電防止剤乃至界面活性剤または帯電防止性可塑剤であることを特徴とする請求項1乃至3の何れかに記載の防虫樹脂組成物。

【請求項5】 請求項1乃至4の何れかに記載の防虫樹脂組成物からなることを特徴とする樹脂成形体。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、害虫防除樹脂組成物およびその成形体に関するもので、より詳細には、電子機器・照明機器・警報機器等のハウジング素材、自動販売機、厨房器、壁材、天井材等へのゴキブリ、アリ、ムカデ、ユスリカ、クモ等の進入を阻止するもので、樹脂自体に防虫性を付与することにより成形体内部への害虫の進入を防止し且つ長期の防虫持続性を有する樹脂組成物及びその成形体に関するものである。

## 【0002】

【従来の技術及びその問題点】現在、住宅様式の変化によりカビの発生を促進し、害虫の発生が増大している。これらの被害の対策には、従来、殺虫剤を用いたエアゾール、燻蒸剤、毒餌や捕獲器などの利用が一般に行われているが、効果の持続性が長くて1年程度と不十分である。

【0003】防虫性の持続性をもたせる処理方法として、防虫剤をマイクロカプセル化させて持続性の向上を図ったり、ABS樹脂（アクリロニトリル／スチレン／ブタジエン樹脂）、硬質PVC等に防虫剤を含有させる方法が一般にとられているが、樹脂が硬質であるために表面に防虫剤がブリードすることなく、衛生害虫、飛来害虫、不快害虫、衣類害虫等には、十分な効果が発現せず、長期間経過後においてもなんら効果の発現を有していない欠点があり、さらに、コスト高であった。

## 【0004】

【発明が解決しようとする課題】そこで、従来の技術においては、防虫性に対して十分な効力の発現が認められず、これらの欠点を鋭意解決するべく検討した結果、本発明は、帯電防止性成分を含有する樹脂中にビスロイド系防虫剤を配合し、さらに、表面への防虫剤の移行促進剤として可塑剤及び／又は効果増強剤を含有させることにより、害虫に対する防虫作用の持続性を制御することができ、しかも、長期間にわたって防虫効果の持続性が得られることを見いだした。

【0005】即ち、本発明の目的は、害虫に対して防虫作用を有する樹脂を提供するものであり、長期間にわたって防虫作用の持続性を有し、しかも樹脂本来の物性を損なわない防虫樹脂組成物およびその成形体を提供するにある。

## 【0006】

【課題を解決するための手段】本発明によれば、帯電防止性成分を含有する樹脂100重量部当たりビスロイド系防虫剤0.05～10重量部を含有し、さらに、表面への防虫剤の移行促進剤として可塑剤0.05～10重量部及び／又は効果増強剤0.05～10重量部を含有することを特徴とする防虫作用の持続性を有する防虫樹脂組成物並びにこの組成物を成形して成る成形体が提供される。

## 【0007】

【発明の実施形態】本発明では、帯電防止性成分を含有する樹脂100重量部に対してビスロイド系防虫剤0.05～10重量部を含有させ、さらに、表面への防虫剤の移行促進剤に可塑剤0.05～10重量部及び／又は効果増強剤0.05～10重量部を含有させることが特徴である。

【0008】上記防虫樹脂組成物を用いることにより、ABS樹脂、ポリカーボネート、硬質PVC、ポリスチロール、アクリル系樹脂、オレフィン系樹脂等の樹脂に防虫剤を単独で配合する場合に比べて、害虫に対して長期間にわたって防虫作用を持続させることができ、しかも樹脂本来の物性を損なうことがない。

【0009】一般に、ABS樹脂、ポリカーボネート、硬質PVC、ポリスチロール、アクリル系樹脂、オレフィン系樹脂等に代表される樹脂に、ビスロイド系防虫剤を配合しても、高相溶性のために、ビスロイド系防虫剤が樹脂内部に親和した状態で包含されて、表面移行が阻害され、防虫効果は殆ど発現しない。

【0010】そこで、これらの樹脂に帯電防止性成分を含有させることにより、防虫剤を表面に移行させる（帯電防止性の基は同時に親水性基でもある）ことを試みたが、防虫剤の表面移行に対しては、未だ十分ではなかった。

【0011】本発明者らは、帯電防止性成分を含有する樹脂に、ビスロイド系防虫剤を配合すると共に、これ

に可塑剤或いは更に効果増強剤を配合することにより、ビレスロイド系防虫剤の樹脂成形体表面への移行が有効に行われ、しかも防虫効果が持続することを見いだした。

【0012】後述する例を参照されたい。即ち、永久帯電防止性を付与したABS樹脂に、ビレスロイド系防虫剤を配合した場合（比較例1）には、初期は勿論のこと、経時させた場合にも、防虫剤の表面への移行は殆ど生じない。また、帯電防止性を付与していないABS樹脂に、ビレスロイド系防虫剤と可塑剤とを組み合わせで配合した場合（比較例2）には、初期は勿論のこと、経時させた場合にも、防虫剤の表面への移行は殆ど有効に生じない。これに対して、永久帯電防止性を付与したABS樹脂に、ビレスロイド系防虫剤と可塑剤とを組み合わせで配合した場合（実施例1）には、防虫剤の表面への移行が有効に行われると共に、耐候処理後における移行も有効に行われ、防虫性能の持続性にも顕著に優れているのである。更に、効力増強剤を併用すると（実施例4）、移行性がより増強され、持続性も向上する。

【0013】本発明において、帯電防止性成分を含有する樹脂と可塑剤との組み合わせが、ビレスロイド系防虫剤の樹脂成形体表面への移行を促進するのは現象として見いだされてものであり、その理由は、決してこれに拘束されるものではないが、防虫剤を樹脂表面に移行させるに十分な経路が確保され、樹脂に防虫剤の移行相を網目状に微分散させるのに役立っているものと思われる。

【0014】本発明で、帯電防止性成分を含有する樹脂100重量部にビレスロイド系防虫剤、可塑剤及び／又は効果増強剤を上記量比で用いることも重要であり、防虫剤の量が上記範囲を下回ると防虫効果の点で不十分となり、一方上記範囲を上回ると樹脂物性の点で不満足となる。また、可塑剤の量が上記範囲を下回ると表面への移行が不十分となり、上記範囲を上回ると樹脂物性の点で不満足となる。効果増強剤の量についても同様である。

【0015】〔樹脂〕本発明では、樹脂として、ABS樹脂、硬質塩化ビニル、ポリカーボネート、ポリスチロール（HIPS、GPPS）、アクリル樹脂、ポリエチレン、ポリプロピレン、エチレン／酢酸ビニルコポリマー、ポリアミド等の樹脂を使用することができる。

【0016】帯電防止性成分は、親水性高分子をもつポリエーテル（例えば、ポリエチレノキシド、ポリエーテルアミド、ポリエーテルエステルアミド、ポリエーテルエステルイミド、エチレノキシド・エビハロヒドリン共重合体、エチレノキシド・エビクロロヒドリン重合体等）、カチオン活性剤である4級アンモニウム塩（4級アンモニウム塩基含有（メタ）アクリレート共重合体、4級アンモニウム塩基含有マレイミド共重合体等）、スルホン酸塩（ポリスチレンスルホン酸ソーダー等）、第一級アミン塩、第三級アミン塩、アニオン活性

剤であるリン酸エステル塩、アルキルスルホン酸塩等、非イオン活性剤である多価アルコール脂肪酸エステル、脂肪アルコールエチレノキシド等、両性活性剤であるカルボン酸誘導体、イミダゾリン誘導体、帯電防止性可塑剤（サンソサイザーC-100、C-300 新日本理化学工業製、又は、AM-801 積水化学製）等から成る群より選択された少なくとも1種の帯電防止性基を有する化合物が、単独或いは2種以上の組み合わせで使用される。

【0017】又は、帯電防止性基を有する材料を含む樹脂を使用することもできる。例えば、永久帯電防止剤（レオレックスAS 第一工業製薬製）、ベレスタット（三洋化成製）を樹脂に含有した材料や永久帯電防止ABS樹脂（トヨラックバレル；東レ製、アデオン；旭化成製）や帯電防止性可塑剤等から成る群より選択された少なくとも1種の帯電防止性基を有する化合物が単独或いは、2種以上の組み合わせで使用される。

【0018】ビレスロイド系防虫剤としては、テラレトリン、ビレトリン、ベルメトリン、サイフエリスリン、アレスリン、フタルスリン、プラレトリン、フラメトリン、レスメトリン、ビレスメトリン、フェントリン、ビフェントリン、シフェントリン、シフルトリン、デルタメトリン、トラロメトリン、エンベントリン、フェンバレート、サイバーメトリン、エトフェンブロックス、フルフェンブロックス、フルプロキシフェン及びシラフルオフェンから成る群より選択された少なくとも1種のビレスロイド系化合物が単独或いは、2種以上の組み合わせで使用される。

【0019】可塑剤としては、フタル酸エステル系可塑剤、アジピン酸エステル系可塑剤等のエステル系可塑剤、ポリエステル系可塑剤、磷酸エステル系可塑剤、塩素系可塑剤などがあげられる。

【0020】効果増強剤としては、一般にビレトリン共力剤として知られているもの、即ちビレスロイド系防虫剤に殺虫力を持たないある物質を混用することにより殺虫力を増強できる物質が使用され、例えばオクタクロロジブロビルエーテル（S-421）、ビペロニルブドキサイド、サイネピリン500、n-ブロビルゾーム、サフロキシシン、MGK-264から成る群より選択された少なくとも1種の化合物が、単独或いは2種以上の組み合わせで使用される。

【0021】本発明では、帯電防止性成分を含有する樹脂（帯電防止性基を有する樹脂を含んでもよい）100重量部にビレスロイド系防虫剤0.05～10重量部、特に0.1～5重量部の量で用いるのがよく、さらに、表面への防虫剤の移行促進剤に可塑剤0.05～10重量部、特に0.2～5重量部及び／又は強力剤0.05～10重量部、特に0.2～5重量部を含有するのがよい。

【0022】ビレスロイド系防虫剤の配合の仕方には、

樹脂の混練時にビレスロイド系防虫剤が存在する限り特に制限はなく、樹脂、可塑剤及び／又は効果増強剤に予め配合してもよい。勿論、これらをマスターバッチ化して未配合物と混練することもできる。

【0023】本発明の樹脂組成物には、必要に応じて他の添加物、例えば、無機フィラー類、中和剤、酸化防止剤、紫外線吸収剤、結晶核剤、顔料、分散剤、過酸化物質等を添加することができる。

【0024】また、本発明の樹脂組成物は、押出成形、インフレーション成形、射出成形、ブロー成形、プレス成形等の成形が可能であり、電子機器のハウジング素材、自動販売機、厨房器、壁材、天井材等あるいは、その構成部品として有用である。

【0025】

【実施例】以下、実施例により本発明を具体的に説明するが、本発明はこれら実施例に限定されるものではない。尚、表1に示される防虫剤、可塑剤及び効力増強剤に示されている%及び部は、重量基準である。

【0026】実施例1〜7

永久帯電防止ABS樹脂100重量部（トヨラックバレルTP10 東レ製）に対して、ビレスロイド系防虫剤としてエトフェンブロックス（三井東圧化学製）、アレスリン（住友化学製）及びヘルメトリン（住友化学製）を、さらに、可塑剤としてジ・2エチルヘキシル・フタレート（DOP、積水化学製）、ジ・2エチルヘキシル・アジベート（DOA、積水化学製）、効力増強剤としてオクタクロロジプロビルエーテル（S-421、三共製）を所定の量配合して、ヘンシェルミキサーで均一に混合した後、押出成形し、厚み1mmで10×10mmのシート状の試験体を得た。

【0027】実施例8

永久帯電防止ABS樹脂100重量部（アデオンA100 旭化成製）に対してビレスロイド系防虫剤としてエトフェンブロックス（三井東圧化学製）、さらに、可塑剤としてジ・2エチルヘキシル・アジベート（DOA、積水化学製）を所定の量を配合して、ヘンシェルミキサーで均一に混合した後、押出成形し、厚み1mmで10×10mmのシート状の試験体を得た。

【0028】実施例9

永久帯電防止ABS樹脂100重量部（トヨラックバレルTP10 東レ製）に対してビレスロイド系防虫剤としてエトフェンブロックス（三井東圧化学製）、さらに、可塑剤としてジ・2エチルヘキシル・アジベート（DOA、積水化学製）を所定の量配合して、ヘンシェルミキサーで均一に混合した後、押出成形し、厚み1mmで10×10mmのシート状の試験体を得た。

【0029】実施例10

ABS樹脂（No. 15 JSR製）90重量部に永久帯電防止剤レオレックスAS（第一工業製薬製）10重量部を均一に分散した後、ビレスロイド系防虫剤として

エトフェンブロックス（三井東圧化学製）、さらに、可塑剤としてジ・2エチルヘキシル・アジベート（DOA、積水化学製）を所定の量を配合して、ヘンシェルミキサーで均一に混合した後、押出成形し、厚み1mmで10×10mmのシート状の試験体を得た。

【0030】実施例11〜12

硬質PVCコンパウンド100重量部に対してビレスロイド系防虫剤としてエトフェンブロックス（三井東圧化学製）、さらに、可塑剤としてジ・2エチルヘキシル・アジベート（DOA、積水化学製）、効力増強剤としてオクタクロロジプロビルエーテル（S-421）を所定の量を配合して、ヘンシェルミキサーで均一に混合した後、押出成形し、厚み1mmで10×10mmのシート状の試験体を得た。

【0031】比較例1

永久帯電防止ABS樹脂100重量部（トヨラックバレルTP10 東レ製）に、ビレスロイド系防虫剤としてエトフェンブロックス（三井東圧化学製）を所定の量を配合して、ヘンシェルミキサーで均一に混合した後、押出成形し、厚み1mmで10×10mmのシート状の試験体を得た。

【0032】比較例2

ABS樹脂（No. 15 JSR製）100重量部に、ビレスロイド系防虫剤としてエトフェンブロックス（三井東圧化学製）、さらに、可塑剤としてジ・2エチルヘキシル・フタレート（DOP）を所定の量を配合して、ヘンシェルミキサーで均一に混合した後、押出成形し、厚み1mmで10×10mmのシート状の試験体を得た。

30 【0033】比較例3

ABS樹脂（No. 15 JSR製）100重量部に、ビレスロイド系防虫剤としてエトフェンブロックス（三井東圧化学製）、さらに、可塑剤としてジ・2エチルヘキシル・アジベート（DOA、積水化学製）を所定の量を配合して、ヘンシェルミキサーで均一に混合した後、押出成形し、厚み1mmで10×10mmのシート状の試験体を得た。

【0034】比較例4

ABS樹脂（No. 15 JSR製）100重量部に対してビレスロイド系防虫剤としてエトフェンブロックス（三井東圧化学製）、さらに、可塑剤としてジ・2エチルヘキシル・アジベート（DOA、積水化学製）と、効力増強剤としてオクタクロロジプロビルエーテル（S-421 三共製）を所定の量を配合して、ヘンシェルミキサーで均一に混合した後、押出成形し、厚み1mmで10×10mmのシート状の試験体を得た。

【0035】比較例5

ABS樹脂（No. 15 JSR製）100重量部に対してビレスロイド系防虫剤としてアレスリン（住友化学製）、さらに、可塑剤としてジ・2エチルヘキシル・ア

ジベート(DOA、積水化学製)と、効力増強剤としてオクタクロジプロピルエーテル(S-421 三共製)を所定の量を配合して、ヘンシェルミキサーで均一に混合した後、押出成形し、厚み1mmで10×10mmのシート状の試験体を得た。

【0036】※ゴキブリに対する効力性

実施例1～12および比較例1～6で得られたシートについて防虫効果の評価を行った。その方法は、上記シートに、チャバネゴキブリ雌雄各5頭を直径9cmビーカー内に入れ、直接接触させた時のノックダウン率の経時×10

\*変化を調べた。試験は、製造直後と60℃下で6ヶ月間の耐候処理した試験体について行った。その結果を表1に示す。

ノックダウン頭数

ノックダウン率(%) =

全ゴキブリ頭数

【0037】

【表1】

ノックダウン率

例	樹脂	防虫剤 (%)	可塑剤 (%)	効力増強剤 (%)	耐候処理	ノックダウン率(%)				
						5	12	24	48	72(hr)
実施例1	ABS	1,7-ジクロロノボルネン 1	DOP 3	-	無	0	20	40	50	60
					60℃×6ヶ月	0	20	30	50	60
実施例2	ABS	1,7-ジクロロノボルネン 2	DOP 2	S-421 1	無	10	30	30	60	70
					60℃×6ヶ月	0	20	30	40	60
実施例3	ABS	1,7-ジクロロノボルネン 1	DOA 1	-	無	10	20	40	60	80
					60℃×6ヶ月	10	30	30	50	60
実施例4	ABS	1,7-ジクロロノボルネン 1	DOA 1	S-421 1	無	30	60	70	100	100
					60℃×6ヶ月	20	40	60	80	90
実施例5	ABS	1,7-ジクロロノボルネン 2	DOA 2	-	無	20	50	70	80	100
					60℃×6ヶ月	20	50	60	70	90
実施例6	ABS	1,7-ジクロロノボルネン 2	DOA 2	-	無	30	30	40	60	60
					60℃×6ヶ月	10	30	30	50	50
実施例7	ABS	1,7-ジクロロノボルネン 2	DOA 2	-	無	20	30	30	60	70
					60℃×6ヶ月	10	30	50	50	70
実施例8	ABS	1,7-ジクロロノボルネン 2	DOA 2	-	無	10	20	40	60	60
					60℃×6ヶ月	0	30	30	40	40
実施例9	ABS	1,7-ジクロロノボルネン 2	C-300 2	-	無	10	20	50	60	90
					60℃×6ヶ月	0	10	30	60	70
実施例10	ABS	1,7-ジクロロノボルネン 1	DOA 1	-	無	0	20	40	50	70
					60℃×6ヶ月	0	0	30	50	60
実施例11	硬質PVC	1,7-ジクロロノボルネン 2	DOA 2	-	無	0	10	10	40	50
					60℃×6ヶ月	0	0	10	20	40
実施例12	硬質PVC	1,7-ジクロロノボルネン 3	DOA 3	S-421 1	無	10	30	50	70	90
					60℃×6ヶ月	0	30	50	50	80
比較例1	ABS	1,7-ジクロロノボルネン 2	-	-	無	0	0	0	10	10
					60℃×6ヶ月	0	0	0	0	10
比較例2	ABS	1,7-ジクロロノボルネン 2	DOP 2	-	無	0	0	0	20	30
					60℃×6ヶ月	0	0	0	10	30
比較例3	ABS	1,7-ジクロロノボルネン 2	DOA 2	-	無	0	0	10	20	20
					60℃×6ヶ月	0	0	10	20	30
比較例4	ABS	1,7-ジクロロノボルネン 2	DOA 2	S-421 1	無	0	10	30	30	30
					60℃×6ヶ月	0	0	20	30	30
比較例5	ABS	1,7-ジクロロノボルネン 2	DOA 2	S-421 1	無	0	10	20	30	30
					60℃×6ヶ月	0	0	0	10	20

【0038】

【発明の効果】本発明によれば、帯電防止性成分を含有する樹脂100重量部にピレスロイド系防虫剤0.05～1.0重量部を含有させると共に、表面への防虫剤の移

行促進剤に可塑剤0.05～1.0重量部及び/又は効果増強剤0.05～1.0重量部を含有することにより、害虫に対する防虫作用を移行により有効に発現させることができ、且つ長期間にわたって防虫効果を持続させるこ

とができる。

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(51)Int.Cl. <sup>6</sup>	識別記号	片内整理番号	F I	技術表示箇所
A 0 1 N 53/02			C 0 8 K 5/04	K A M
53/08			C 0 9 K 3/16	1 0 2 E
C 0 8 K 5/04	K A M			1 0 2 L
C 0 9 K 3/16	1 0 2			1 0 3 A
				1 0 3 C
	1 0 3			1 0 3 Z
				1 0 6 E
	1 0 6			1 0 7 D
	1 0 7			1 0 8 C
	1 0 8		A 0 1 N 53/00	1 0 8 D
				5 0 2 C
				5 0 8 C